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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,574

12/27/2005

Akio Sato

02886.0095

7889

22852 7590 06/23/2010
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EXAMINER

NGUYEN, HUNG D

ART UNIT

PAPER NUMBER

3742

MAIL DATE

DELIVERY MODE

06/23/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/562,574	Applicant(s) SATO ET AL.	
	Examiner HUNG NGUYEN	Art Unit 3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 04 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-3, 6 and 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota (JP-09-155583) (cited by applicant) in view of Lewis (US Pat. 5,837,960) and Nowotny et al. (DE 19909390) (both previously cited).**

3. Regarding claims 1, 3, 6 and 11, Oota et al. discloses a laser-clad processing apparatus for laser- clad processing a valve-seat portion of a cylinder head, comprising: a cylinder-head holding device (Fig. 1) holding the cylinder head 34 (Fig. 1) in an inclined orientation so that a central axial line of the valve seat portion defines a generally vertical line (Fig. 3); a laser-processing head irradiating a laser beam 48 (Fig. 1) onto a process part of the valve seat portion 50 (Fig. 4), while discharging a powdery material 54 (Fig. 4) to the process part; wherein the laser-processing head comprising a supply of powdery material (Par. 26), configured to provide direct the powdery material 54 (Fig. 4) in a direction with an equal amount across the process part of the valve seat portion (Fig. 4). Oota et al. does not disclose a rotator rotating the laser-processing head around the central axial line of the valve seat portion such that said laser-processing head is inclined with respect to the generally vertical line; the laser-processing head includes a coaxial nozzle configured to direct the powder material in a

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direction substantially parallel to the central axial line across the process part of the valve seat portion; a swirling chamber and a rectifier rectifying a flow path of the powdery material; and the laser beam passes through the coaxial nozzle. Lewis et al. discloses a rotator 21 (Fig. 1) rotating the laser-processing head 1 (Fig. 1) around the central axial line of the article 3 (Fig. 1) such that said laser-processing head is inclined (by rotation about a horizontal shaft 24) with respect to the generally vertical line (Col. 7, Lines 12-19); the laser-processing head includes a coaxial nozzle (Fig. 2) configured to direct the powder material in a direction substantially parallel to the central axial line across the process part (by rotating about a horizontal shaft 24). Nowotny et al. discloses a swirling chamber 1 (Fig. 1) and a rectifier 2 (Fig. 1; Abstract); the laser beam 7 (Fig. 1) passes through the coaxial nozzle 3 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Oota et al., a rotator rotating the laser-processing head around the central axial line of the valve seat portion such that said laser-processing head is inclined with respect to the generally vertical line and the laser-processing head includes a coaxial nozzle configured to direct the powder material in a direction substantially parallel to the central axial line across the process part of the valve seat portion, as taught by Lewis, for the purpose of having more mobility and control with respect to the workpiece; and a swirling chamber and a rectifier rectifying a flow path of the powdery material; and the laser beam passes through the coaxial nozzle, as taught by Nowotny et al., in order to ensure the constant flow of the powder material onto the valve seat portion.

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4. Regarding claim 2, Oota et al. further discloses the laser-clad processing apparatus wherein said cylinder-head holding device comprises: an inclination device (Fig.1) inclining the cylinder head 34 (Fig. 1) between two positions, a first position wherein a central axial line of an inlet valve seat 44 (Fig. 1) is substantially parallel to a vertical line and a second position wherein a central axial line of an outlet valve seat 46 (Fig. 1) is substantially parallel to the vertical line (Par. 24, Fig. 2 and 4); and a horizontal-movement device 16 and 24 (Fig. 1) moving the cylinder head in the X-axis direction and in the Y-axis direction, which crosses with the X-axis direction perpendicularly, on a horizontal plane (Par. 20-21).

5. Regarding claim 11, Lewis et al. further discloses when stopping the supply of the powdery material, the flow of said powder material is stopped, and a carrier gas pressure is lowered toward a predetermined value while taking a predetermined time since the time at the flow stoppage or immediately before the flow stoppage (Col. 13, Lines 44-48; Col. 22, Lines 18-23).

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE 19909390) and further view of Satou et al. (US. Pat. 6,838,638 B2) (previously cited).

7. Regarding claim 4, Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above **except** for the laser-beam generator comprises a plurality of laser diode arrays, and shapes said laser beam by controlling the laser diode arrays depending on a width direction of said valve-seat portion. Satou et al. discloses

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the laser diode arrays 3 (Fig. 1) and the laser beam shapes are controlled by the laser diode arrays depends on the width direction of the valve-seat portion (Col. 8, Lines 23-37). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify Oota/Lewis/Nowotny, a plurality of laser diode arrays, as taught by Satou et al., for the purpose of controlling the distribution of energy in accordance with a width position of the part to be process.

8. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE 19909390) and further view of Mihashi (JP Pat. 2891378 B2) (previously cited).

9. Regarding claim 5, Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head. Mihashi discloses the powdery-material supply 19 (Fig. 1) includes pressurized carrier-gas 29 (Fig. 1) to compressively supply the powdery material to said laser-processing head 21 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Oota/Lewis/Nowotny, the powdery-material supply includes pressurized carrier-gas to compressively supply the powdery material to said laser-processing head, as taught by Mihashi, for the purpose of improving the welding quality as weld metal is supplied.

10. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE

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19909390) and further view of Nagano et al. (US Pat 6,717,106 B2) (previously cited).

11. Regarding claim 7, Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above **except** the shape of the laser beam has rectangular shape. Nagano et al. discloses a laser beam is a rectangular shape 16 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Oota/Lewis/Nowotny, a laser beam shape has a rectangular shape, as taught by Nagano et al., for the purpose of condensing the laser beam for better melting the powder material.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE 19909390) and further view of Scalzotto (Pub. No. US 2002/0003132) (previously cited).

13. Regarding claim 8, Oota/Lewis/Nowotny discloses substantially all features of the claimed invention as set forth above s except for the laser-processing head is rotated normally and is rotated reversely along said valve-seat portion. Scalzotto discloses the laser focusing head 10 (Fig. 1) connected to the mobile element 12 (Fig. 1) of the laser machine, the mobile element can turn about an axis A/the arrow 14 (Fig. 1). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in the combined reference to include the laser-processing head is rotate, as taught by Scalzotto, for the purpose of varying the distance between the focusing area of the laser beam and the beam nozzle.

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14. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE 19909390) and further view of Kawasaki et al. (US Pat. 5,571,430) (previously cited).

15. Regarding claim 9, Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above including Nowotny, rectified flow of the powdery material (Abstract and English Translation) **except** the rectified flow of the powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction. Kawasaki et al. discloses powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction (Fig. 6-7). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Oota/Lewis/Nowotny, the rectified flow of the powdery material results in a concentrated deposit on the valve seat portion within a circle whose diameter is adapted to a side of the laser beam, a side crossing perpendicular to the processing development direction, as taught by Kawasaki et al., for the purpose of properly melting the powder material after it deposited to the cylinder head.

16. Regarding claim 10, the Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above **except** for the powdery material is melted by irradiating the laser beam behind a deposition center of the powdery material by a

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predetermined distance with respect to the development direction of laser processing.

Kawasaki et al. discloses the powdery material PF (Fig. 6) is melted by irradiating the laser beam LL (Fig. 6) behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing (Col. 10, Lines 15-52). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Oota/Lewis/Nowotny, the powdery material is melted by irradiating the laser beam behind a deposition center of the powdery material by a predetermined distance with respect to the development direction of laser processing, as taught by Kawasaki et al., for the purpose of melting the powder material within the molten pool in the processing direction.

17. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oota et al. (JP 09-155583) in view of Lewis et al. (US Pat. 5,830,960), Nowotny et al. (DE 19909390) and further view of Yomo et al. (JP 405311385A) (previously cited).

18. Regarding claim 12, Oota/Lewis/Nowotny disclose substantially all features of the claimed invention as set forth above **except** for the laser-clad processing method wherein: before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air. Yomo et al. discloses high pressure gas inlet pipe 17 (Fig. 1) is inserted into the powder feed pipe 16 (Fig. 1) and into the transducing box 18 (Fig. 1); the pressure of the gas is reduced in the box 18 (Fig. 1) to a constant pressure, the powder is then supplied to a spraying device from a pipe 19 (Fig. 1) along with the

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carrier gas. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to modify in Oota/Lewis/Nowotny, the laser-clad processing method wherein: before supplying the powdery material, a carrier gas flow volume is increased; immediately before starting the flow of the powdery material, the flow volume is decreased to a steady flow volume; and immediately before a flow stoppage, the carrier gas is opened to air, as taught by Yomo et al., for the purpose of uniform the thickness of the powder material.

19. Applicant's arguments, see page 4, Lines 2-20, filed 3/4/2010, with respect to claim 1 and 6 have been fully considered and are persuasive. The rejection of claim 1 and 6 has been withdrawn.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUNG NGUYEN whose telephone number is (571)270-7828. The examiner can normally be reached on Monday-Friday, 9M-6PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tu Hoang can be reached on (571)272-4780. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/HUNG NGUYEN/
Examiner, Art Unit 3742
6/16/2010
/TU B HOANG/

Supervisory Patent Examiner, Art Unit 3742